

## CLAIMS

[1] An optical transmitting device of modulating a modulated optical signal by a first signal with a second signal for transmission, the device comprises:

an optical splitting means for splitting the modulated optical signal by the first signal;

a photoelectric conversion means for converting one of the split optical signals to an electrical signal; and

a cancellation means for canceling interference against the second signal contained in the other of the split optical signals, by using the converted electrical signal.

[2] The optical transmitting device as set forth in claim 1, the cancellation means comprises:

a filter means for extracting an electrical signal of a frequency spectrum at least partially overlapped with a frequency spectrum of the second signal, in the converted electrical signal;

a phase adjustment means for adjusting a phase of the extracted electrical signal; and

a modulation means for modulating the other of the split optical signals with the phase-adjusted electrical signal.

[3] The optical transmitting device as set forth in claim 1, the cancellation means comprises:

a filter means for extracting an electrical signal of a frequency spectrum at least partially overlapped with a frequency spectrum of the second signal, in the converted electrical signal;

a phase adjustment means for adjusting a phase of the extracted electrical signal;

a combining means for combining the phase-adjusted electrical signal and the second signal; and

a modulation means for modulating the other of the split optical signals with the combined signal.

[4] The optical transmitting device as set forth in any one of claims 1 to 3, the first signal is an FM batch converted signal.

[5] The optical transmitting device as set forth in claim 4, the second signal is a satellite broadcasting RF signal.

[6] An optical transmission system comprising the optical transmitting device as set forth in claim 5 and an optical receiving device to receive an optical signal transmitted via an optical path from the optical transmitting device, the optical receiving device comprise:

an optical splitting means for splitting the

received optical signal to an optical signal containing the FM batch converted signal and an optical signal containing the satellite broadcasting RF signal;

a first photoelectric conversion means for converting the optical signal containing the FM batch conversion signal split by the optical splitting means to an electrical signal;

a demodulation means for FM demodulating the electrical signal converted by the first photoelectric conversion means;

a second photoelectric conversion means for converting the optical signal containing the satellite broadcasting RF signal split by the optical splitting means to an electrical signal; and

a downconverting means for down-converting the electrical signal converted by the second photoelectric conversion means.

[7] An optical transmission system comprising the optical transmitting device as set forth in claim 5 and an optical receiving device to receive an optical signal transmitted via an optical path from the optical transmitting device, the optical receiving device comprises:

a photoelectric conversion means for converting the received optical signal to an electrical signal;

a filter means for separating the electrical signal converted by the photoelectric conversion means to the FM batch converted signal and the satellite broadcasting RF signal;

a demodulation means for FM demodulating the FM batch conversion signal separated by the filter means; and

a downconverting means for down-converting the satellite broadcasting RF signal separated by the filter means.

[8] An optical transmitting method for modulating a modulated optical signal by a first signal with a second signal for transmission, the method comprises:

splitting the modulated optical signal by the first signal;

converting one of the split optical signals to an electrical signal; and

canceling interference against the second signal contained in the other of the split optical signals using the converted electrical signal.

[9] The optical transmitting method as set forth in claim 8, the canceling step comprises:

extracting an electrical signal of a frequency spectrum at least partially overlapped with a frequency spectrum of the second signal, in the converted

electrical signal;

adjusting a phase of the extracted electrical signal; and

modulating the other of the split optical signals with the phase-adjusted electrical signal.

[10] The optical transmitting method as set forth in claim 8, the canceling step comprises:

extracting an electrical signal of a frequency spectrum at least partially overlapped with a frequency spectrum of the second signal, in the converted electrical signal;

adjusting a phase of the extracted electrical signal;

combining the phase-adjusted electrical signal and the second signal; and

modulating the other of the split optical signals with the combined signal.

[11] The optical transmitting method as set forth in any one of claims 8 to 10, the first signal is an FM batch converted signal.

[12] The optical transmitting method as set forth in claim 11, the second signal is a satellite broadcasting RF signal.

[13] An optical transmission method comprises:

transmitting a modulated optical signal by the FM batch converted signal and the satellite broadcasting RF signal in accordance with the optical transmitting method as set forth in claim 12;

receiving and splitting the transmitted optical signal to an optical signal containing the FM batch converted signal and an optical signal containing the satellite broadcasting RF signal;

converting the optical signal containing the split FM batch converted signal to an electrical signal for demodulation; and

converting the optical signal containing the split satellite broadcasting RF signal to an electrical signal for downconversion.

[14] An optical transmission method comprises:

transmitting a modulated optical signal by the FM batch converted signal and the satellite broadcasting RF signal in accordance with the optical transmitting method as set forth in claim 12;

receiving and converting the transmitted optical signal to an electrical signal;

separating the converted electrical signal to the FM batch converted signal and the satellite broadcasting RF signal;

demodulating the separated FM batch conversion

signal; and

downconverting the separated satellite  
broadcasting RF signal.